Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1. (Currently Amended) In a telemetric knee prosthesis adapted to measure forces transmitted across the knee joint, the knee prosthesis having a femoral component, a tibial bearing member in articulating contact with the femoral component, a tibia engaging member and a tibial tray engaged to the tibial bearing member and the tibia engaging member, the tibial tray comprising:

an upper plate having a portion configured for engaging the tibial bearing member;

a lower plate having a portion configured for engaging the tibia engaging member, said lower plate spaced apart from said upper plate and defining a plurality of cavities opening away from said upper plate, each of said cavities including a diaphragm adapted to flex when subjected to a load normal to the diaphragm;

a plurality of support posts, each connected between said upper plate and said diaphragm of a corresponding one of said plurality of cavities, wherein said support posts are circular in cross-section and have a diameter that is about 1/3 the diameter of the corresponding one of said plurality of cavities; and

a force sensing element disposed within each of said plurality of cavities and operable to produce an output signal in response to flexing of said diaphragm.

Claim 2. (Original) The tibial tray of claim 1, wherein said support posts each have a diameter of about 5.0 mm.

Claims 3-7. (canceled)

Claim 8. (Previously presented) In a telemetric knee prosthesis adapted to measure forces transmitted across the knee joint, the knee prosthesis having a femoral component, a tibial bearing member in articulating contact with the femoral component, a tibia engaging member and a tibial tray engaged to the tibial bearing member and the tibia engaging member, the tibial tray comprising:

an upper plate having a portion configured for engaging the tibial bearing member;

a lower plate having a portion configured for engaging the tibia engaging member, said lower plate spaced apart from said upper plate and defining a plurality of cylindrical cavities opening away from said upper plate, each of said plurality of cylindrical cavities including a circular diaphragm adapted to flex when subjected to a load normal to the diaphragm and an outer wall;

a plurality of support posts, each connected between said upper plate and said diaphragm of a corresponding one of said plurality of cylindrical cavities; and

a force sensing element disposed within each of said plurality of cavities and operable to produce an output signal in response to flexing of said diaphragm, said force sensing element including four pairs of radially aligned strain gages, the strain gages of

each pair arranged to measure differential strain in a radial direction and includes an inner gage mounted on said diaphragm adjacent the center of said circular diaphragm and an outer gage mounted on said diaphragm immediately adjacent said outer wall of said cylindrical cavity, wherein said circular diaphragm exhibits a micro-strain behavior under load that produces a maximum magnitude at a radial location from the center of said circular diaphragm, and further wherein said inner gage is positioned to span said maximum magnitude radial location.

Claim 9. (Previously presented) In a telemetric knee prosthesis adapted to measure forces transmitted across the knee joint, the knee prosthesis having a femoral component, a tibial bearing member in articulating contact with the femoral component, a tibia engaging member and a tibial tray engaged to the tibial bearing member and the tibia engaging member, the tibial tray comprising:

an upper plate having a portion configured for engaging the tibial bearing member;

a lower plate having a portion configured for engaging the tibia engaging member, said lower plate spaced apart from said upper plate and defining a plurality of cylindrical cavities opening away from said upper plate, each of said plurality of cylindrical cavities including a circular diaphragm adapted to flex when subjected to a load normal to the diaphragm and an outer wall;

a plurality of support posts, each connected between said upper plate and said diaphragm of a corresponding one of said plurality of cylindrical cavities; and

a force sensing element disposed within each of said plurality of cavities and operable to produce an output signal in response to flexing of said diaphragm, said force sensing element including four pairs of radially aligned strain gages, the strain gages of each pair arranged to measure differential strain in a radial direction and includes an inner gage mounted on said diaphragm adjacent the center of said circular diaphragm and an outer gage mounted on said diaphragm immediately adjacent said outer wall of said cylindrical cavity, wherein said circular diaphragm exhibits a micro-strain behavior under load that produces a zero-crossing point between the center of said circular diaphragm and said outer wall of said cylindrical cavity, and further wherein said outer gage is positioned between said zero-crossing point and said outer wall.

Claim 10. (original) The tibial tray of claim 9, wherein said circular diaphragm exhibits a micro-strain behavior under load that produces a negative maximum magnitude at a radial location between said zero-crossing point and said outer wall, and further wherein said outer gage is positioned to span said negative maximum magnitude radial location.

Claim 11. (original) The tibial tray of claim 9, wherein said circular diaphragm further exhibits a micro-strain behavior under load that produces a positive maximum magnitude at a radial location from the center of said circular diaphragm, and further wherein said inner gage is positioned to span said positive maximum magnitude radial location.

Claim 12. (Currently Amended) In a telemetric knee prosthesis adapted to measure forces transmitted across the knee joint, the knee prosthesis having a femoral component,

a tibial bearing member in articulating contact with the femoral component, a tibia engaging member and a tibial tray engaged to the tibial bearing member and the tibia engaging member, the tibial tray comprising:

an upper plate having a portion configured for engaging the tibial bearing member;

a lower plate having a portion configured for engaging the tibia engaging member, said lower plate spaced apart from said upper plate and defining a plurality of cavities opening away from said upper plate, each of said plurality of cavities including a diaphragm adapted to flex when subjected to a load normal to the diaphragm, said lower plate further defining a central cavity disposed between said plurality of cavities and a plurality of wiring channels, each communicating between a corresponding one of said plurality of cavities and said central cavity;

a plurality of support posts, each connected between said upper plate and said diaphragm of a corresponding one of said plurality of cavities;

a force sensing element disposed within each of said plurality of cavities and operable to produce an output signal in response to flexing of said diaphragm said force sensing element including four pairs of radially aligned strain gages, the strain gages of each pair arranged to measure differential strain in a radial direction;

a circuit element disposed in said central cavity for processing said output signal from said force sensing element in each of said plurality of cavities; and

wiring electrically connecting each force sensing element in said plurality of cavities to said circuit element to transmit said output signal, said wiring disposed in a corresponding one of said plurality of wiring channels,

wherein said lower plate defines a plane perpendicular ~~parallel~~ to the sagittal plane of the knee joint when the knee prosthesis is implanted therein,

wherein each of said four pairs of strain gages is aligned in ~~a~~ one of two radial planes ~~plane~~ that are ~~is~~ at about 45 degrees relative to said sagittal ~~parallel~~ plane, and

wherein none of said four pairs of radially aligned strain gages is aligned with said wiring channel communicating with said corresponding one of said plurality of cavities.

Claim 13. (original) The tibial tray of claim 12, wherein said four pairs of radially aligned strain gages are aligned at an angle of about 45 degrees or 135 degrees relative to said wiring channel.

Claim 14. (Currently amended) A telemetric knee prosthesis comprising:

an upper tibial tray plate having a portion configured for coupling with a tibial bearing member;

a lower tibial tray plate spaced apart from the upper tibial tray plate and defining a plurality of cavities opening away from the upper tibial tray plate, each of the plurality of cavities including an outer wall and a diaphragm adapted to flex when subjected to a load on the diaphragm;

a plurality of support posts, each of the plurality of support posts extending between the upper tibial tray plate and the diaphragm of a corresponding one of the plurality of cavities; and

a plurality of force sensing elements, each of the plurality of force sensing elements disposed within one of the plurality of cavities and operable to produce an output signal in response to flexing of the diaphragm in the respective one of the plurality of cavities, each of the plurality of force sensing elements including an inner gage positioned such that at least a portion of the inner gauge is mounted at a location on one side of the diaphragm directly opposite to where a portion of the corresponding one of the plurality of support posts contacts the other side of the diaphragm.

Claim 15. (Previously presented) The tibial tray of claim 14, wherein at least a portion of the inner gauge is mounted on the one side of the diaphragm at a radius of less than about 2.5 mm from the center of the diaphragm.

Claim 16. (Previously presented) The tibial tray of claim 14, wherein the diaphragm is a circular diaphragm which exhibits a micro-strain behavior under load that produces a maximum magnitude at a radial location from the center of the circular diaphragm, and further wherein the inner gage is positioned to span the maximum magnitude radial location.

Claim 17. (Previously presented) The tibial tray of claim 16, wherein:

the circular diaphragm exhibits a micro-strain behavior under load that produces a zero-crossing point between the center of the circular diaphragm and the outer wall of the cylindrical cavity; and

each of the plurality of force sensing elements further comprises an outer gage positioned between the zero-crossing point and the outer wall.

Claim 18. (Previously presented) The tibial tray of claim 14, wherein the support posts are circular in cross-section.